- - REMARKS - -

Claims 1-20 remain under consideration. The claims, drawings and specification have been amended herein to obviate informalities and improve their form. Claim 7 has been amended herein, in accordance with the Examiner's comments in paragraph 10 of the Office Action.

EXAMINER INTERVIEW

Applicants' Counsel Lawrence E. Crowe expresses his appreciation for the courtesy extended by the Examiner during a telephone interview on May 8, 2003.

OBJECTION TO THE DRAWINGS

The Examiner's objections to claims 18-20, with respect to the drawings, is rendered moot by the amendments made herein to claims 18-20. FIG. 1 of the drawings shows an apparatus 10 having an antenna support 12, in accordance with the limitations of claims 18-20.

REJECTIONS UNDER 35 USC § 1029(c)

The rejection of claims 1-8 and 13-20 as being anticipated by Hegendoerfer (US Patent No. 6,326,922) is traversed.

Independent claims 1 and 13, and all claims depending therefrom, require *inter alia*, an antenna consisting essentially of a substrate of dielectric material defining a longitudinal axis of the substrate and a surface of the substrate, and a plurality of electrically conductive elements disposed on the surface of the substrate to form a Yagi-Uda dipole array. An antenna according to this invention achieves a higher gain, wider bandwidth, and is capable of operating at higher frequencies than an antenna according to Hegendoerfer, without the low noise amplifier (LNA) that Hegendoerfer requires be mounted on the substrate with antenna elements.

For example, Hegendoerfer relies on the LNA to compensate for inherent losses of 3dB in his antenna design, and reports an antenna gain of 9 dBi, and a noise figure of 1 dB, at an optimum pointing azimuth of zero degrees. Column 5, lines 37-38. The present invention produces an antenna gain of 10dBi and a noise figure of 1 dB, without using an LNA. The ability of the present invention to achieve such performance without reliance on the LNA required in Hegendoerfer, results in an antenna that can be made significantly smaller and at a lower cost, due to elimination of the need for the LNA.

Because Hegendoerfer requires the LNA, in addition to dipole components, it cannot anticipate independent claims 1 or 13, or any claim depending therefrom.

Regarding claim 2, one of the reasons that Applicant's invention provides superior gain and other performance characteristics, is that Applicant's antenna is constructured in such a manner that a significantly greater portion of the electromagnetic energy generated by the driven element is coupled to the parasitic elements through surface waves in the substrate than is the case in an antenna having a construction according to Hegendoerfer. Page 3 of present Application. Applicant recognized that these surface waves could be utilized to obviate the need for an LNA in developing his invention. In some embodiments of the present invention, the Applicant utilizes a specially selected substrate material having an extremely low loss tangent, significantly lower than the epoxy glass substrates of Hegendoerfer, and also having a lower dielectric than the epoxy glass substrates of Hegendoerfer. Page 6, lines 12- page 7 line 9. The combination of low loss tangent and low dielectric strength of the substrate materials preferred by the Applicant result in an antenna that is smaller in physical size and considerably more efficient than an antenna constructed according to Hegnedoerfer.

Hegendoerfer makes no disclosure indicating that he had any recognition of the phenomenon of energy conduction through utilization of surface waves in the substrate, and therefore Hegendoerfer cannot be said to anticipate the limitations of claim 2.

Regarding the Examiner's comments regarding claims 15-20, with respect to the illustrations of FIG. 1 of Hegendoerfer, Applicant notes that the illustrations on FIG. 1 are of prior art devices that might benefit from an antenna such as is disclosed in Hegendoerfer. Hegendoerfer makes no disclosure of how his antenna would be incorporated into those devices, however.

The present application discloses a number of specific constructions for incorporating an antenna according to the present invention into the devices shown in FIG. 1. By eliminating the need for surface mount devices comprising an LNA to be mounted on the antenna, as is required by Hegendoerfer, an antenna according to the present invention is considerably more compact and easier to attach to a much wider array of antenna supports in the various types of apparatuses shown in FIG. 1. An antenna according to the present invention can also utilize a flexible substrate that easily molds itself to odd shaped surfaces, such as the inside surface of a body panel of a vehicle. Hegendoerfer makes no disclosure of an ability to use a flexible substrate, and specifically discloses a two piece folding substrate, thereby teaching away from the flexible thin substrates preferred for the present invention. An antenna, according to the present invention, is so small and thin, that it can easily be mounted on the surface of items such as a PCMCIA card, and still allow the card to slide into its slot without interference. The SMD components of the LNA of Hegendoerfer would preclude sliding the card into the slot.

CLAIM REJECTIONS UNDER 35 USC § 103

The following quotation from MPEP § 2142 forms part of the basis for traversing all obviousness rejections set for the in the Office Action:

> In order to support a prima facie case of obviousness three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not be based on the Applicant's disclosure.

The rejection of claims 9-12 under 35 USC 103(a), as unpatentable over Hegendoerfer (US Patent No. 6,326,922), is traversed.

Hegendoerfer does not teach or suggest all of the limitations of claims 9-12, and cannot therefore render any of claims 9-12 obvious. Contrary to the Examiner's assertions in paragraph 13 of the Office Action, the specific dimensions and orientations of the elements of claims 9-12 are not a mere matter of design choice, constituting a mere change in size, but are specific limitations anticipated by the Applicant to enhance performance of an antenna, according to the present invention, without the need for resorting to the LNA required by Hegendoerfer. The Applicant's insight in utilizing surface waves and other dimensional limitations to obviate the need for the LNA of Hegendoerfer is contrary to the understandings and expectations of the art, and therefore renders claims 9-12 non-obvious. *In re Hirao*, 535 F2.d 67 (CCPA 1976).

SUMMARY

Applicants believe that the application is in condition for allowance. Reconsideration and notification of allowance are respectfully requested.

PROCEDURAL MATTERS AND FEES

Applicant believes that no fees are occasioned by the submittal of this paper. The commissioner is authorized, however, to charge any fees or credit any refunds occasioned by submittal of this paper to deposit account number 07-0960.

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Respectfully submitted,
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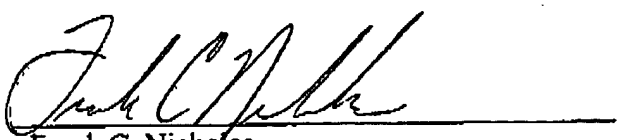

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